



Core Maths Reading List – Mathematics

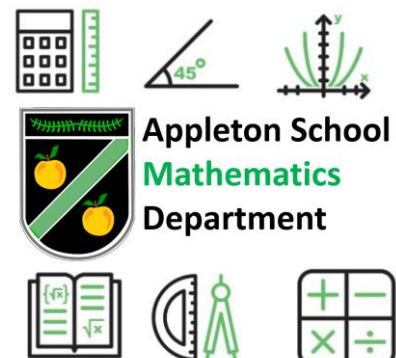
Here's a comprehensive reading list for a Year 12 student studying **AQA Core Mathematics** at Sixth Form. These resources cover essential topics and provide opportunities for deeper exploration, including research activities to consolidate and extend their understanding.

1. Textbooks & Core Resources

1. **"AQA A Level Mathematics for A Level Year 1"** by Stephen Ward and Paul Fannon
 - *Why?*: This textbook directly follows the AQA syllabus, providing clear explanations, examples, and practice questions. It covers key Year 12 topics like algebra, calculus, trigonometry, and statistics.
 - *Follow-up Research Activity*: Investigate historical developments of calculus. Present findings on how Newton and Leibniz contributed to its creation and how it's used in modern-day science and economics.
2. **"AQA A Level Mathematics Year 1 (AS) Student Book"** by Collins
 - *Why?*: Another excellent book for Year 12, designed specifically for the AQA spec. It provides structured chapters on all core units, including extensive practice and exam-style questions.
 - *Follow-up Research Activity*: Research how logarithms and exponentials are used in fields like population growth, financial modeling, or environmental science. Create a case study on real-world applications.
3. **"CGP A-Level Mathematics: AQA Year 1 & AS Complete Revision & Practice"**
 - *Why?*: CGP books are popular for their straightforward language, revision tips, and useful summaries. The practice sections help to reinforce core concepts.
 - *Follow-up Research Activity*: Create a presentation on different types of sequences and series. Compare their applications in biology (e.g., population dynamics), computer science (e.g., algorithms), and finance (e.g., interest rates).

2. Advanced Study & Exploration

4. **"Further Pure Mathematics" by Brian Gaultier and Mark Gaultier**
 - *Why?*: This book goes beyond the basics of A-Level maths into more advanced topics, making it great for stretching capable students and exploring complex areas.
 - *Follow-up Research Activity*: Explore the role of complex numbers in quantum mechanics or electrical engineering. Investigate why imaginary numbers are crucial for modeling waves.
5. **"Mathematics: A Very Short Introduction" by Timothy Gowers**
 - *Why?*: This book offers a fantastic overview of what mathematics really is, its importance, and how mathematicians think. It's perfect for encouraging a more conceptual understanding.
 - *Follow-up Research Activity*: Research the lives and contributions of famous mathematicians (e.g., Euler, Ramanujan). Write a report on how their discoveries influence modern mathematics.
6. **"The Code Book: The Science of Secrecy from Ancient Egypt to Quantum Cryptography" by Simon Singh**





- *Why?*: This book introduces cryptography, which uses mathematics to secure information. It's engaging and shows how maths plays a vital role in real-world security.
- *Follow-up Research Activity*: Research and build simple encryption algorithms. Explain how public key cryptography is used to secure internet communication and banking.

3. Problem-Solving & Exam Practice

7. "AQA A Level Maths Practice Papers" by AQA

- *Why?*: These practice papers are produced by AQA and provide valuable insights into exam format, style, and expectations.
- *Follow-up Research Activity*: After completing practice papers, compare your approach to official mark schemes. Identify common pitfalls and strategies to avoid them in future exams.

8. "Edexcel A-Level Mathematics: Exam Practice Workbook" by CGP

- *Why?*: Even though it's for Edexcel, this workbook has a great range of problem-solving questions that are applicable across different exam boards, providing additional challenge and variety.
- *Follow-up Research Activity*: Create your own exam questions for a specific topic, such as calculus or statistics. Swap with classmates and mark each other's work, providing feedback based on the mark scheme.

4. Enrichment & Application

9. "How to Think Like a Mathematician" by Kevin Houston

- *Why?*: This book focuses on improving the student's ability to solve problems and think logically. It's about developing a mathematical mindset, which is essential for success at A-Level.
- *Follow-up Research Activity*: Try solving classic mathematical puzzles or problems from the book. Present your methods and solutions to classmates or create a blog showcasing your mathematical problem-solving journey.

10. "Fermat's Last Theorem" by Simon Singh

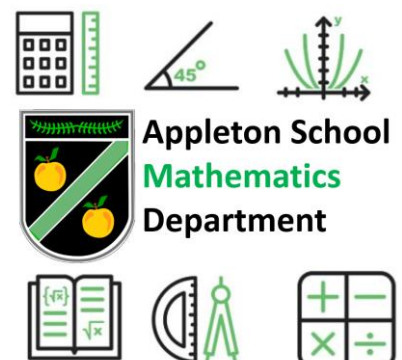
- *Why?*: This is a fantastic read for students interested in the history of mathematics and how one of the most famous problems in maths was solved.
- *Follow-up Research Activity*: Research other famous unsolved problems in mathematics, such as the Riemann Hypothesis or the P vs NP problem. Present a summary of these problems, their significance, and the impact they could have on the future of mathematics.

5. Online Resources & Tools

• Dr. Frost Maths

- *Why?*: Free access to a wide range of problems, solutions, and videos covering all A-Level topics. Interactive questions and instant feedback help students improve rapidly.
- *Research Activity*: Track your progress on Dr. Frost Maths by focusing on weaker topics. Review video explanations and attempt harder questions to deepen understanding.

• Brilliant.org





- *Why?*: This platform offers interactive courses in maths, from algebra to calculus. It encourages deep thinking and problem-solving in a fun, engaging way.
- *Research Activity*: Complete the “Mathematical Thinking” course and document how each new concept links to your A-Level syllabus. Reflect on how visual problem-solving helps you grasp complex topics better.
- **Wolfram Alpha**
 - *Why?*: Wolfram Alpha is a computational tool that helps with graphing, solving equations, and much more. It's particularly useful for checking work.
 - *Research Activity*: Use Wolfram Alpha to explore how changing parameters in equations affects graphs and solutions. Record your observations in a mathematical journal.

Conclusion

By using a blend of textbooks, problem-solving books, and engaging enrichment materials, students can gain a well-rounded understanding of AQA Core Mathematics. The addition of research tasks and exploration beyond the syllabus will help foster a deeper appreciation for the subject, prepare them for future study, and develop critical thinking skills.

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